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pollen from stamens of all lengths develops readily on the stigmas of all lengths of pistil, provided the stigmas are of the well formed sort. From this and anatomical evidence he concludes that *Epigaea* is not truly heterostylous. With regard to dioecism, it was found that pollen develops readily upon the well formed stigmas, but not at all upon the poorly formed sort, although ovules with normal embryo sacs are present in the ovaries. Thus the flowers with small stigmas are apparently perfect but are functionally male, and the species is functionally dioecious. The author has also recorded some interesting facts concerning the development of the seed. The embryo sac is of the usual eight-nucleate type, and is surrounded by a layer of "tapetum" except at the much prolonged micropylar end. There is no period of free nuclear division in the development of the endosperm, transverse walls at once separating the sac into four chambers, in all of which the further cells divisions occur rapidly. When the endosperm is well developed it produces at each end a knoblike haustorial outgrowth which extends into the tissue of the integument.—LESTER W. SHARP.

**Crown-gall.**—In their account of the crown-gall of plants, SMITH, BROWN, and TOWNSEND<sup>12</sup> described the occurrence of secondary galls originating at some distance from primary galls which had been produced by direct infection, and suggested that the secondary galls arose in some way from the primary galls, although the mode of origin was not clear at that time. This problem has now been solved by a histological study of the crown-gall by SMITH, BROWN, and McCULLOCH.<sup>13</sup> They find that the secondary galls arise from strands of tissue which originate from the primary galls and make their way along the stem or leaf, usually in the region of the primary wood. The tumor strand apparently does not absorb the cells in its path, but makes its way by crushing and flattening them. Secondary galls arise at various points along the tumor strand. A cross-section of a secondary gall developing in the leaf from a strand arising from a primary gall in the stem shows a stem structure with the woody elements greatly developed and regularly arranged like the secondary wood of a stem. If, however, a primary gall develops in the leaf as a result of direct inoculation, its structure is irregular. The tissue consists of an enormous development of parenchyma intermixed with irregular masses of tracheids. There is no distinct differentiation of parts as in the secondary galls arising from stem galls. The similarity which has been formerly pointed out between these plant galls and animal tumors leads the writers to consider the crown-gall apart from all other plant diseases, and to place it in the category of true tumors.—H. HASSELBRING.

<sup>12</sup> Rev. Bot. Gaz. 52:75. 1911.

<sup>13</sup> SMITH, ERWIN F., BROWN, NELLIE E., and McCULLOCH, LUCIA, The structure and development of crown gall; a plant cancer. Bur. Pl. Ind. Bull. 255. pp. 60. figs. 2. pls. 109. 1912.